**In the Claims:**

1. (Previously presented) An optoelectronic memory comprising:

an information-storage medium that can be locally and reversibly switched between at least two optical states by application of electrical fields to rotatable molecular components contained therein; and

an information-storage-layer-optical-state detection means that detects and reports the optical states of the rotatable molecular components in the information-storage medium.

2. (Original) The optoelectronic memory of claim 1 wherein the information-storage-layer-optical-state detection means further includes:

a detector layer within the information-storage medium that responds differently to an interrogating signal depending on the optical state of the information-storage medium; and

a read/write device that applies the interrogating signal to regions of the information-storage medium and generates a reporting signal based on a response of the detector layer.

3. (Previously presented) The optoelectronic memory of claim 2 wherein the detector layer responds to an electromagnetic-radiation-based interrogation signal that is transmitted through the information-storage medium when the information-storage medium is in a first optical state, and that is not transmitted through the information-storage medium when the information-storage medium is in a second optical state.

4. (Original) The optoelectronic memory of claim 2 wherein the detector layer responds to an electromagnetic-radiation-based interrogation signal that is transmitted through the information-storage medium by generating an electric current.

5. (Original) The optoelectronic memory of claim 2 wherein the read/write device applies an electromagnetic-radiation-based interrogation signal to regions of the information-storage medium, detects whether or not the detector layer generates an electric current in response to the applied electromagnetic-radiation-based interrogation signal, and returns an electric-current or electric-voltage signal when the detector layer generates an electric current in response to the applied electromagnetic-radiation-based interrogation signal.

6. (Previously presented) An optoelectronic memory device comprising:

an information-storage medium that includes an information-storage layer that can be locally and reversibly switched between at least two optical states by application of electrical fields to rotatable molecular components contained therein;

a detector layer within the information-storage medium that can detect whether or not an applied electromagnetic radiation beam is transmitted through the information-storage medium at different positions of the information-storage medium; and

a read/write device that applies electrical fields to write information into the information-storage layer and that applies electromagnetic-radiation beams in order to read information stored in the information-storage layer.

7. (Original) The optoelectronic memory device of claim 6 wherein the information-storage layer comprises a two-dimensional optical state-change organic polymer having a relatively rigid, fused-ring, organic-dye-based planar network and acetylene-linked rotatable molecular components.

8. (Previously presented) The optoelectronic memory device of claim 7 wherein the rotatable molecular components can be rotational oriented by application of an electrical field thereto.

9. (Original) The optoelectronic memory device of claim 8 wherein the rotatable molecular components can be stably oriented in a rotational position coplanar with the relatively rigid, fused-ring, organic-dye-based planar network, leading to a fully conjugated organic-dye-based two-dimensional polymer that absorbs and/or reflects electromagnetic radiation of a particular frequency range, and wherein the rotatable molecular components can be stably oriented in a rotational position approximately orthogonal to the relatively rigid, fused-ring, organic-dye-based planar network, leading to a not-fully conjugated organic-dye-based two-dimensional polymer that is transparent to electromagnetic radiation of the particular frequency range.

10. (Previously presented) The optoelectronic memory device of claim 6 wherein the information-storage medium includes:

an information-storage layer comprising a two-dimensional optical state-change organic-polymer film that can be locally, stably, and reversibly switched between a first optical state that absorbs or reflects electromagnetic radiation of a particular frequency and a second optical state that is transparent to electromagnetic radiation of the particular frequency;

an electrode layer that is transparent to electromagnetic radiation of the particular frequency; and

a photodiode detector layer that, when illuminated by electromagnetic radiation of the particular frequency, generates a current.

11. (Previously presented) The optoelectronic memory device of claim 10 wherein the read/write device applies an electrical field of a first polarity to a small region of the ~~first,~~ information-storage layer to induce the first optical state within that region to represent a first binary value, applies an electrical field of a second polarity to a small region of the ~~first,~~ information-storage layer to induce the second optical state within that region to represent a second binary value, and illuminates a small region of the ~~first,~~ information-storage layer in order to access information stored in the information-storage layer by detecting whether or not the photodiode detector layer generates an electrical current in response to the illumination.

12. (Previously presented) A method for storing a bit of information, the method comprising:

providing an optoelectronic memory device that includes an information-storage medium with an information-storage layer that can be locally and reversibly switched between at least two optical states by application of electrical fields to rotatable molecular components within the information-storage layer and that includes a detector layer within the information-storage medium that can detect whether or not an applied electromagnetic radiation beam is transmitted through the information-storage medium at different positions of the information-storage medium;

when the bit of information has a first binary value, applying an electrical field of a first polarity to a small region of the ~~first,~~ information-storage layer to induce the first optical state within that region; and

when the bit of information has a second binary value, an electrical field of a second polarity to the small region of the ~~first,~~ information-storage layer to induce the second optical state within that region.

13. (Previously presented) The method of claim 12 further comprising:

subsequently illuminating a small region of the information-storage layer in order to access information stored in the information-storage layer by detecting whether or not the detector layer generates an electrical current in response to the illumination.

14. (Original) The method of claim 12 wherein the information-storage layer comprises a two-dimensional optical state-change organic polymer having a relatively rigid, fused-ring, organic-dye-based planar network and acetylene-linked rotatable molecular components.

15. (Original) The method of claim 14 wherein the rotatable molecular components can be stably oriented in a rotational position coplanar with the relatively rigid, fused-ring, organic-dye-based planar network, leading to a fully conjugated organic-dye-based two-dimensional polymer that absorbs and or reflects electromagnetic radiation of a particular frequency range, and wherein the rotatable molecular components can be stably oriented in a rotational position approximately orthogonal to the relatively rigid, fused-ring, organic-dye-based planar network, leading to a not-fully conjugated organic-dye-based two-dimensional polymer that is transparent to electromagnetic radiation of the particular frequency range.

16. (Previously presented) A method for constructing an optoelectronic memory, the method comprising:

providing an information-storage medium that can be locally and reversibly switched between at least two optical states by application of electrical fields to rotatable molecular components contained therein; and

using an information-storage-layer-optical-state detection means to detect and report the optical states of regions of the information-storage medium.

17. (Previously presented) The method of claim 16 wherein the information-storage-layer-optical-state detection means further includes:

a detector layer within the information-storage medium that responds differently to an interrogating signal depending on the optical state of the information-storage medium; and

a read/write device that applies the interrogating signal to regions of the information-storage medium and generates a reporting signal based on a response of the detector layer.

18. (Previously presented) The method of claim 17 wherein the detector layer responds to an electromagnetic-radiation-based interrogation signal that is transmitted through the information-storage medium, when the information-storage medium is in a first optical state, and that is not transmitted through the information-storage medium, when the information-storage medium is in a second optical state.

19. (Previously presented) The method of claim 17 wherein the detector layer responds to an electromagnetic-radiation-based interrogation signal that is transmitted through the information-storage medium by generating an electric current.

20. (Previously presented) The method of claim 17 further including:

applying an electromagnetic-radiation-based interrogation signal to regions of the information-storage medium, using the read/write device, to detect whether or not the detector layer generates an electric current in response to the applied electromagnetic-radiation-based interrogation signal; and

returning an electric-current or electric-voltage signal when the detector layer generates an electric current in response to the applied electromagnetic-radiation-based interrogation signal.

21. (Previously presented) An optoelectronic memory device, comprising:

an information-storage medium having an information-storage layer therein that can be locally and reversibly switched between at least two optical states by application of an electric field thereto, said information-storage layer comprising a two-dimensional optical state-change organic polymer having relatively rigid, fused-ring, organic-dye-based planar network and acetylene-linked rotatable molecular components therein.

22. (Previously presented) The memory device of Claim 21, further comprising:

a detector layer within said information-storage medium that can detect whether or not an applied electromagnetic radiation beam is transmitted through the information-storage medium; and

a read/write device configured to apply electrical fields while writing information into said information-storage layer and further configured to apply electromagnetic-radiation beams to said information-storage layer when reading information stored therein.

23. (Previously presented) The memory device of claim 22, wherein the rotatable molecular components can be rotationally oriented by application of an electrical field thereto.

24. (Previously presented) The memory device of claim 23, wherein the rotatable molecular components can be stably oriented in a rotational position coplanar with the relatively rigid, fused-ring, organic-dye-based planar network, leading to a fully conjugated organic-dye-based two-dimensional polymer that absorbs and/or reflects electromagnetic radiation of a particular frequency range, and wherein the rotatable molecular components can be stably oriented in a rotational position approximately orthogonal to the relatively rigid, fused-ring, organic-dye-based planar network, leading to a not-fully conjugated organic-dye-based two-dimensional polymer that is transparent to electromagnetic radiation of the particular frequency range.

25. (Previously presented) A method of operating an optoelectronic memory device having an information-storage medium therein containing an information-storage layer that can be locally and reversibly switched between at least two optical states by application of electrical fields and that includes a detector layer within the information-storage medium that can detect whether or not an applied electromagnetic radiation beam is transmitted through the information-storage medium at different positions of the information-storage medium, said method comprising:

applying an electric field of a first polarity to a small region of the information-storage layer to induce the first optical state within that region that corresponds to a bit of information having a first binary value;

applying an electric field of a second polarity to the small region of the information-storage layer to induce the second optical state within that region that corresponds to a bit of information having a second binary value; and

wherein the information-storage layer comprises a two-dimensional optical state-change organic polymer having a relatively rigid, fused-ring, organic-dye-based planar network and acetylene-linked rotatable molecular components therein.

26. (Previously presented) The method of claim 25,

wherein the rotatable molecular components can be stably oriented in a rotational position coplanar with the relatively rigid, fused-ring, organic-dye-based planar network, leading to a fully conjugated organic-dye-based two-dimensional polymer that absorbs and or reflects electromagnetic radiation of a particular frequency range; and

wherein the rotatable molecular components can be stably oriented in a rotational position approximately orthogonal to the relatively rigid, fused-ring, organic-dye-based planar network, leading to a not-fully conjugated organic-dye-based two-dimensional polymer that is transparent to electromagnetic radiation of the particular frequency range.